



PT31

DIFFERENTIAL PRESSURE TRANSMITTER



INSTALLATION MANUAL

23/06 - CODE: ISTR_I_PT31_E_02 --

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Validity: From firmware version 5.8.



Before continuing or performing any calibration, carefully read the entire paragraph:

1. Important warnings.

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1 IMPORTANT WARNINGS

Familiarize yourself with the meaning of the following listed procedures before making any decisions regarding their performance.

The following procedures can be carried out not only with the magnetic buttons as indicated below, but also by means of a facility (PDA or Modem PC) with Hart protocol (Hart interface model APTHI321 is required).

1. **ZERO calibration procedure**

It is used to calibrate the transmitter in the **Zero** value only by physically connecting the relative differential pressure value on the measurement ports (E.g.: with a calibrator). If you do not have valid pressure references, avoid using this procedure.

2. **SPAN calibration procedure**

Serve a tarare il trasmettitore nel valore di **Span**. Vedi avvertimento precedente.

3. **ZERO OFFSET (Zero Trim) calibration procedure**

The **zero offset** calibration must be carried out when the transmitter is first installed, as the mounting position and/or the separator, if any, influence the zero value read by the transmitter throughout the configured scale range. This procedure allows the elimination of this offset (if < 10% of the scale range).

4. **ZERO elevation/suppression procedure (Zero Adjust)**

If the pressure transmitter is used for level measurements with the use of separators, the zero offset calibration procedure could be difficult or not feasible (Ex: zero compensation over 10% of the scale range).

In the case of a flanged separator, with extension by means of capillaries or in any case with filling, the filling fluid invalidates the measurement as it adds its own pressure contribution, due to its own weight, to what is already present, for example, in the tank. It is therefore necessary to cancel this error for a correct measurement; often, however, the weight of the filling is sensitive, in other cases it is not possible to intervene in the process quickly and place oneself in the conditions of being able to implement the hydrostatic zero. In these cases, the best solution is to use the field compensation procedure, which "in-

forms” the transmitter of the presumed level percentage currently measured. The transmitter will automatically recalculate the compensation necessary for correct operation, using this reference and the scale range already set.

5. **Changing the Measurement Unit (Change Unit)**

Modify the unit in which the measuring range is expressed. Note that this variation, while not modifying the measurement range, modifies the absolute value of the relative **SPAN H** and **SPAN L** (e.g.: scale range 0... 100 mm H₂O. Changing the unit of measurement to Pascal will result in a measuring range approx. 0... 980 Pa).

6. **SPAN H Changing (Change Upper Range Value)**

Set a new upper limit value **SPAN H** measurement (corresponding to 20 mA). It may be necessary if the value communicated in the order or the standard required value, for any reason, needs to be changed. **Contrary to point 2**, no pressure reference is needed.

7. **SPAN L Changing (Change Lower Range Value)**

Set a new lower limit value **SPAN L** measurement (corresponding to 4 mA)(see also point 6.). **Contrary to point 1**, no pressure reference is needed.

8. **Changing the Filter Factor(Damping Second)**

Output filter value (expressed in seconds).

9. **Decimal point setting (Decimal Place)**

Set the decimal point of the transmitter display in “dynamic” or “static” mode. In “dynamic” mode, the transmitter shifts the decimal point according to the measured value. In “static” mode, the decimal point remains in the fixed position compatibly with the set measuring range.

2 OPERATION ON THE TRANSMITTER

2.1 Functions and how to use the buttons

To access the magnetic buttons it is necessary to unscrew both screws of the metal plate located on the top of the transmitter. Below it are two buttons, **ZERO** and **SPAN**.

The buttons can be pressed individually or simultaneously, obtaining different functions.

In both cases and for any function, they must be pressed for at least 3 - 4 seconds, until a consequent action is observed on the display. If it is necessary to press the buttons again, observe a pause of at least 1 s between the various operations.

2.2 Functions menu operation

The flowchart at paragraph 2.3 shows the operation of the function menu.

The only **ZERO** calibration and **SPAN** calibration functions are obtained by pressing the relative buttons only. For all other functions it is necessary to access the **MENU**.

2.2.1 ZERO calibration procedure

1. Apply zero pressure to the transmitter; if separators are fitted, make sure that the process goes to zero conditions.
2. After waiting at least 10 s, press the **ZERO** button for at least 3 s until the writing **Zero** appears on the LCD display.
3. Release the button, wait around 1 s and press the same button for at least 3 s until **-ZR-** appears on the LCD display, then release the button.
4. The procedure is finished. If **Sp Err** or **Sete** appear instead of **-ZR-**, the procedure has not been successful and must be repeated. Verify that the zero conditions are always kept constant during the calibration.

2.2.2 SPAN calibration procedure

1. Apply the pressure relative to the desired **span** to the transmitter; if separators are fitted, ensure that the process is inside the **span** conditions.
2. After waiting at least 10 s, press the **SPAN** button for at least 3 s until **SPAn** appears on the LCD display.
3. Release the button, wait around 1 s and press the same button for at least 3 s until **-SP-** appears on the LCD display, then release the button.
4. The procedure is finished. If **Sp Err** or **Sete** appear instead of **-SP-**, the procedure has not been successful and must be repeated. Verify that the span conditions are always kept constant during the calibration.

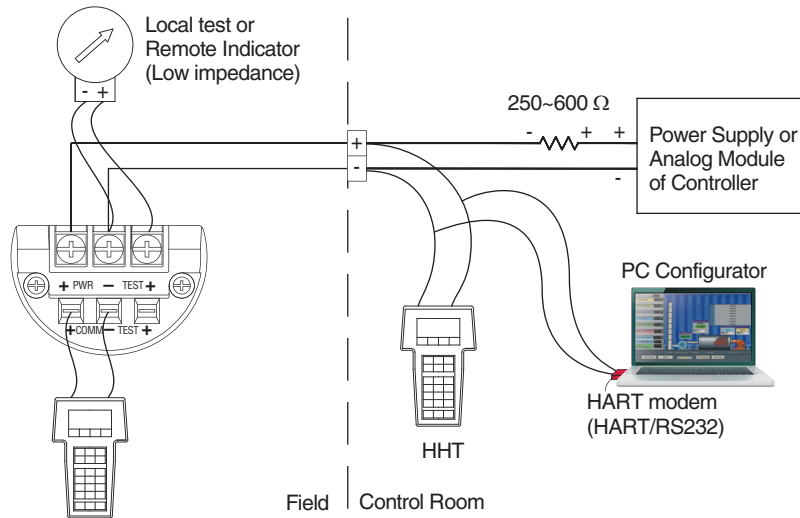
2.2.3 ZERO OFFSET calibration procedure (Zero Trim)

1. Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.
2. Press **SPAN** button until **11 Z-TRIM** appears on the display, then again **SPAN** button until **11 – TR**.

The procedure is finished, wait a few moments for the return to operations.

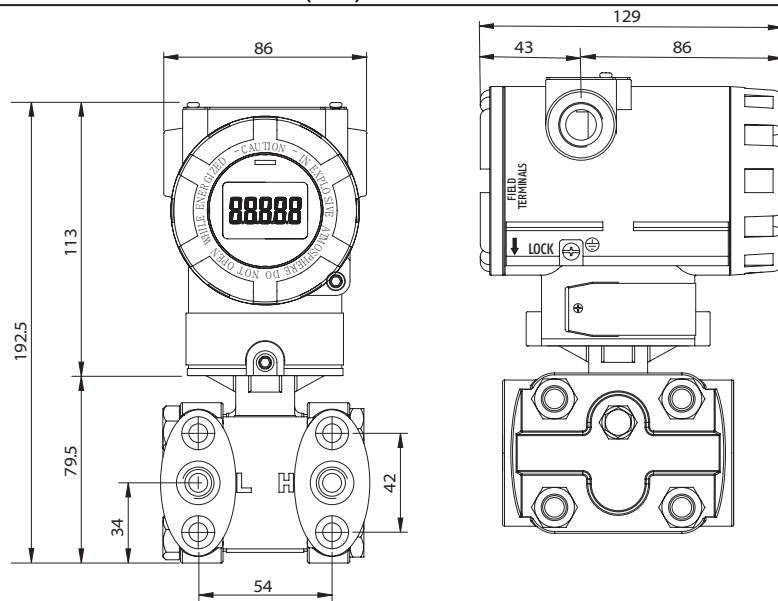
3 ELECTRICAL CONNECTIONS

Note: For ATEX version see complete manual.



4 DIMENSIONS

4.1 Dimensions of the transmitter (mm)



2.2.4 ZERO elevation/suppression procedure (Zero Adjust)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press **SPAN** button until **11 Z-TRIM** appears on the display, then **ZERO** button until **12 Z-ADJ**.

Press **SPAN** button until **Sel Inc** and set the presumed measurement value as follows:

1. Press **ZERO** repeatedly until the desired digit is selected. Confirm with **SPAN** button: **VALUE** will be displayed.
2. Press **SPAN** (-) or **ZERO** (+) repeatedly in order to select the desired value for that digit.
3. Confirm with **ZERO+SPAN** buttons: **Sel Inc** will be displayed.
4. Repeat steps 1 ÷ 2 for the other digits until the desired value is completely entered.
5. Press buttons **ZERO+SPAN** again **IN - OK** and then **-ZA -** will be displayed.

The procedure is finished, wait a few moments for the return to operations.

2.2.5 Engineering unit management (Change Unit)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press **ZERO** button until **2 Setup** appears on the display, then **SPAN** button until **21 UNIT**.

Press **SPAN** button to confirm, then set the desired Engineering Unit as follows:

1. Press **ZERO** repeatedly until the desired Engineering Unit is selected.
2. Confirm with **SPAN** button.

2.2.6 Change SPAN H value (Change Upper Range Value)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press repeatedly **ZERO** button until **2 Setup** appears on the display, then **SPAN** button until **21 UNIT** and again the **ZERO** button until **22 U-RNG**. Now press the **SPAN** button until **Sel Inc** and set the value for **SPAN H**:

1. Press **ZERO** repeatedly until the desired digit is selected. Confirm with **SPAN** button: **VALUE**

will be displayed.

2. Press **SPAN** repeatedly in order to select the desired value. Confirm with **ZERO+SPAN**: **Sel Inc** will be displayed.
3. Repeat steps 1 ÷ 2 for the other digits until the desired value is completely entered.
4. Press buttons **ZERO+SPAN** again **IN - OK** and then **-ZA -** will be displayed.

The procedure is finished, wait a few moments for the return to operations.

2.2.7 Change SPAN L value (Change Lower Range Value)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press repeatedly **ZERO** button until **2 Setup** appears on the display, then **SPAN** button until **21 UNIT** and again the **ZERO** button until **23 L-RNG**. Now press the **SPAN** button until **Sel Inc** and set the value for **SPAN L**:

1. Press **ZERO** repeatedly until the desired digit is selected. Confirm with **SPAN** button: **VALUE** will be displayed.
2. Press **SPAN** repeatedly in order to select the desired value. Confirm with **ZERO+SPAN**: **Sel Inc** will be displayed.
3. Repeat steps 1 ÷ 2 for the other digits until the desired value is completely entered.
4. Press buttons **ZERO+SPAN** again **IN - OK** and then **-ZA -** will be displayed.

The procedure is finished, wait a few moments for the return to operations.

2.2.8 Changing the Filter Factor (Damping Second)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press repeatedly **ZERO** button until **2 Setup** appears on the display, then **SPAN** button until **21 UNIT** and again the **ZERO** button until **24 DAMP**. Now press the **SPAN** button until **Sel Inc** and set the value for **DAMPING**:

1. Press **ZERO** repeatedly until the desired digit is selected. Confirm with **SPAN** button: **VALUE** will be displayed.
2. Press **SPAN** repeatedly in order to select the desired value. Confirm with **ZERO+SPAN**: **Sel Inc** will be displayed.

- Repeat steps 1 ÷ 2 for the other digits until the desired value is completely entered.
- Press buttons **ZERO+SPAN** again **IN - OK** and then **DONE** will be displayed.

The procedure is finished, wait a few moments for the return to operations.

2.2.9 Decimal point position setting (Decimal Place)

Access the **MENU** by pressing the **ZERO+SPAN** buttons simultaneously until **Menu** appears and then **1 Trim**.

Press repeatedly **ZERO** button until **2 Setup** appears on the display, again **ZERO** button until **3 LCD**, then

SPAN until 31 DEC-PL.

Press **SPAN** to confirm, **AUTO** or the previously set value will be displayed. St the desired value for **DECIMAL PLACE**:

- ZERO repeatedly** until the desired position has been reached. Press **SPAN** to confirm, **DONE** then **ESC** will be displayed-

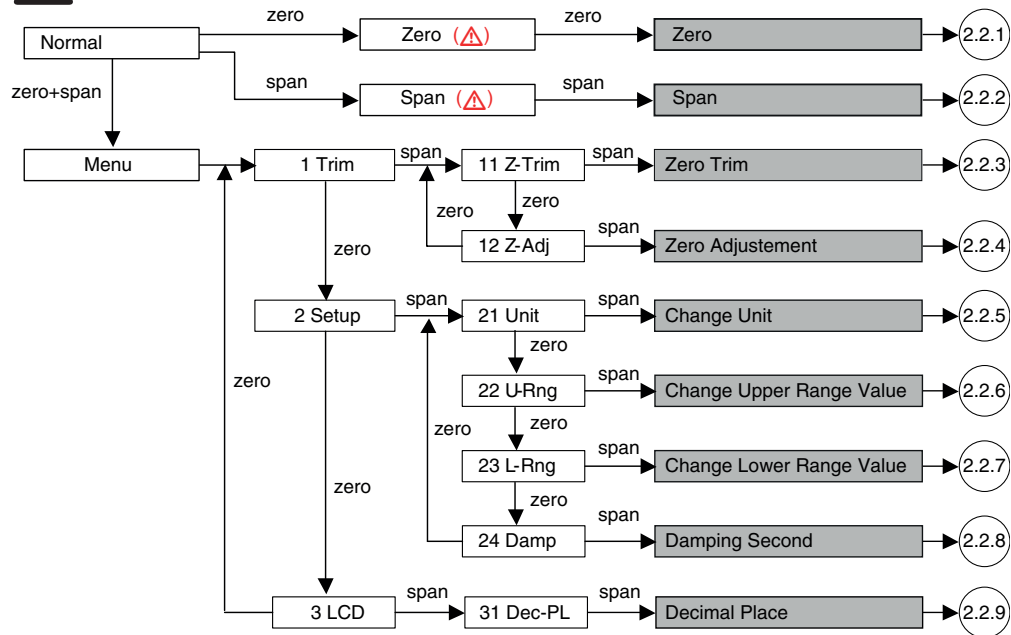
The procedure is finished, wait a few moments for the return to operations.

Note: Selection **AUTO** (recommended) autonomously manages the position of the decimal point in a dynamic way.

2.3 Functions menu operation



If you do not have valid pressure references, avoid using this procedure.



2.4 FAIL MODE selection procedure

The PT31 differential pressure transmitter has an automatic and continuous function test. In case of problems, the unit places its analogue output beyond the normal saturation limits present in the event of over pressure or under pressure. The table below shows the limits due to saturation, measurement and/or any problems:

Value	Saturation	Alarm
Low	3.9 mA	≤ 3.75 mA
High	20.8 mA	≥ 21.75 mA

It is possible to select, in the event of an alarm, the preferred mA analog output mode.

This selection is made by means of the jumpers called "Fail Mode" located in the upper part of the LCD display and alternatively on the CPU card.

In case of instrument purchased without LCD display, use the jumper on the CPU board.

If the Display is present, select the jumper on it (in this case the jumper on the CPU will have previously been set to Down).

FAIL MODE selection	Display presence		Without display CPU
	CPU	LCD	
Fail Down	Down	D	D
	Up	U - D	U
Fail Up	Down	U	U
	Up	U - D	U

Selection via DISPLAY

By inserting the only jumper present on the display, in position:

- U** The High type alarm mode described in the previous table is selected.
- D** The Low type alarm mode described in the previous table is selected

Note: The default selection is: **D**.

Selection via CPU

By inserting jumper number 2 present on the CPU board, in position:

Selezionando il ponticello 2 (vedi schema a lato) presente sulla scheda CPU, nella posizione:

- U** The High type alarm mode described in the previous table is selected.
- D** The Low type alarm mode described in the previous table is selected

Note: The default selection is: **D**.

In case of further elucidations or for any clarification, refer to the instrument's user manual.

For references of the Ascon Tecnologic Customer Service, refer to the website:

www.ascontecnologic.com